APPLICATION FOR UNITED STATES LETTERS PATENT

WIRELESS HEADPHONES WITH CONNECTOR SOCKET

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to wireless headphones operated by at least one storage battery and having a connector socket to insert a charge plug of an electric connection to a power pack. The headphones further have at least one miniature loudspeaker, audio electronics, and a reception part, as well as charging electronics for the monitoring the charging process of the storage battery. Such headphones are more and more frequently used not only to increase the level of carrying comfort and to extend the range of the audio reception area, but also as an accessory for television sets, units for speaking in open areas, and the like.

2. Description of the Related Art

[0002] Independent of whether the storage cell is designed as a single part or multiple parts, the following description sometimes uses the singular and sometimes the plural for better readability, without this representing a limitation. Likewise, sometimes "at least one miniature loudspeaker" is used, since

there are applications in which only one such loudspeaker is present, even if in most cases at least two loudspeakers are present.

[0003] With wireless headphones, the transfer of information takes place by radio waves or infrared beams. Batteries or storage/rechargeable batteries are provided in the headphones for operating the receiver and the miniaturized loudspeakers in the headphone earpieces. Storage batteries have become increasingly popular for use in wireless headphones, and the use of conventional batteries has become rare. In order to be able to undertake the charging of the storage batteries, without having to take them out of the headphones, a corresponding socket is provided, into which the plug of a power pack can be inserted, which thus charges the storage batteries. Usually, suitable electronics are provided in the headphones for evaluating the charge state of the storage batteries. The electronics also control or end the charging process if the storage batteries have been charged to the limit of their capacity.

[0004] For various reasons, for example, universal usage possibility or use even with dead or defective storage

batteries, it is desirable to be able to operate such headphones even with a conventional cable, by means of which the loudspeakers are provided directly with the audio signals in sufficient strength to drive the speakers.

SUMMARY OF THE INVENTION

[0005] In order to solve this problem, it is the primary object of the present invention to provide wireless headphones that have a socket for the insertion of a conventional audio signal cable. Furthermore, electronics or switch mechanics are provided to switch off the reception electronics when the plug of the signal cable is inserted into the socket and transmit the data transmitted via the cable to the miniaturized loudspeakers in the headphone earpieces.

[0006] In a preferred embodiment of the invention a combined socket for the charging process and the signal transmission is provided, into which alternately the customary jacks from the audio cable or the jacks of the charge cable, which are designed similarly in their dimensions in accordance with the invention, but designed differently with conducting or insulating surfaces, can be inserted. As a result of the differently designed conductivities of the surface areas, the switching takes place either mechanically or electronically. With this embodiment, it is also conceivable to charge the storage batteries by means of a special cable, whereas, at the same time, the headphones are operated as traditional, wire-bound headphones.

[0007] The various features of novelty, which characterize the invention, are pointed out with particularity in the claims annexed to and forming part of the disclosure. For a better understanding of the invention, its operating advantages, and specific objects attained by its use, reference should be had to the drawing and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWING

[0008] In the drawing:

[0009] Figure 1 is a conventional plug of a charge cable, designed as a jack;

[0010] Figure 2 shows such a charge plug and a common stereo jack, in immediate vicinity to one another;

[0011] Figure 3shows a socket, in accordance with a preferred embodiment of the invention, used for the charging process; and

[0012] Figure 4shows the socket of Figure 3 used for the transmission of the signals.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] The drawings show, in a completely schematic manner, the supply device, either a power pack or an audio device, and a jack connected by means of a cable. The corresponding sites of the current fed in the socket, and thus in the headphones, are also indicated in a schematic manner. The socket itself is not drawn with its contours in order to provide a clearer view, but rather can be ascertained only by these contact sites.

[0014] Figure 1 shows a power pack 1, connected with a charge plug 3 by means of a cable 4. The plug 3 has a jack designed with two poles so as to have suitable contact in the socket of charging electronics 2, wherein the current needed to charge the (not depicted) storage batteries is removed and further conducted.

[0015] Figure 2 shows the basic execution of the invention with two sockets, one to accept a charge plug 3 (similarly designed as shown in Figure 1) and another socket to accept a common stereo jack 13 that is connected with an audio device 5 by a cable 14. The stereo jack 13 has three conducting surface areas that are separated from one another by two insulating surface areas. In the conventional manner, the signals for the

audio electronics 6 are removed and thus the loudspeakers 7 of the headphones are supplied. Reception electronics 8, which hold the connection to a (not depicted) transmission unit with wireless operation and there receive the audio signals, are connected with the audio electronics 6, and are preferably integrated into it. These reception electronics 8 are shut down when a stereo jack 13 is inserted into the socket; preferably the electronics are simply switched without current.

[0016] Figures 3 and 4 show a particularly preferred embodiment of the invention, in which a single socket, not directly depicted, but ascertainable as a complement to the plugs 3', 13', can be used both for the charging process as well as for the directly cable-bound use of the headphones.

[0017] As can be seen from Figure 3, the geometric configuration of the charge plug 3' is selected so that the contacts of the charging electronics 2 make contact with the two separated, conducting surface areas of the charge plug 3' in the socket. The three contact feelers or rods, which lead to the audio electronics 6, only have one contact, whereas the two other contact rods or springs, or the like, make contact with insulating surface areas of the charge plug 3' and switch the audio electronics 6, and thus finally the loudspeakers 7, without current and therefore inactively.

[0018] If a correspondingly designed stereo plug or jack 13' is inserted into the same socket, it has a configuration and arrangement of the conducting or insulating area, such that the charging electronics 2, with at least one contact site, comes into contact with one insulating area, whereas the contact sites of the audio electronics 6 all come into contact with electrically conducting areas and thus receive the transmitted stereo signal, and can further conduct it to the loudspeakers 7. Also, in this case, provision is made so that the audio electronics 6, directly or mechanically, as a function of the contacting of a corresponding stereo plug 13', switches off or shuts down the reception part 8 of the audio electronics responsible for the reception of the wireless data transmission.

[0019] From the shown and described examples, it is clear that the design of the socket, and thus also the plug, can take place in many diverse ways, wherein it is absolutely possible that the commercial stereo jack can be used as a stereo plug 13,13', which is particularly advantageous for the compatibility of the headphones equipped in accordance with the invention. Of course, it is possible, without any problems, and something easy for those skilled in the relevant art, to conceive of developments and configurations of plugs that fulfill the different requirements, whether in a geometric sense or in a functional sense, so that with a corresponding arrangement of the contact rods or contact points in the box there is also the possibility of providing a combination plug that permits the charging of the storage batteries simultaneously with the wire-bound operation of the headphones.

[0020] The invention is not limited by the embodiments described above which are presented as examples only but can be modified in various ways within the scope of the protection defined by the appended patent claims.